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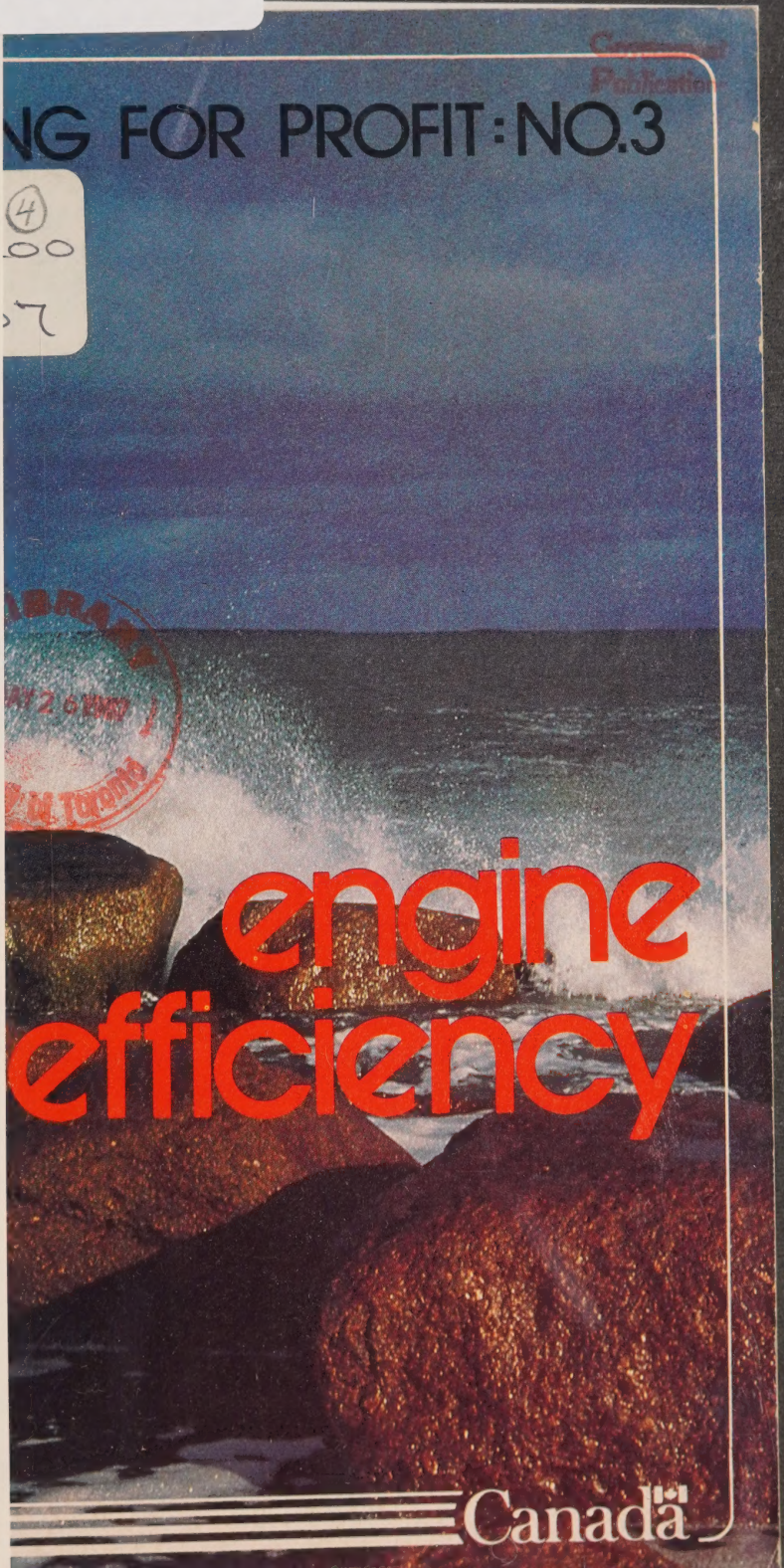
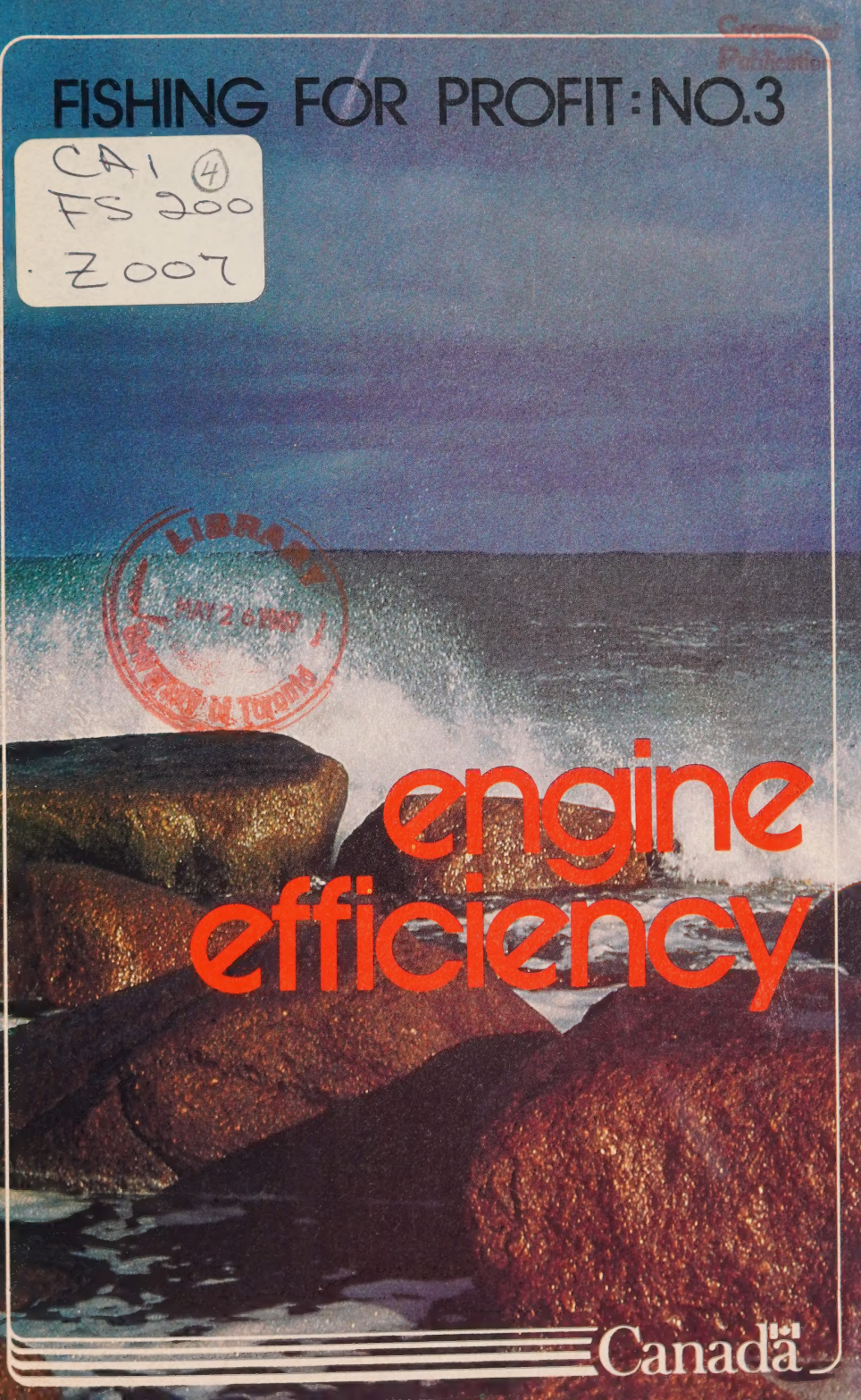


engine efficiency

Canada

FISHING FOR PROFIT: NO.3

engine efficiency



Canada

Preventive maintenance and fuel economy

This brochure has been developed and prepared to assist Fishermen in the day to day care of their boat's engine.

Obviously we have only covered the basics. However, it is still our hope to make fishermen more aware of the importance of maintaining their boat and engine.

If you have any suggestions or problems related to this topic, please contact us at any of the following addresses.

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Newfoundland Region
P.O. Box 5667
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Department of Fisheries and Oceans
Scotia-Fundy Region
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Halifax, (Nova Scotia)
B3J 2S7
(902) 426-8110

Fisheries Development Branch
Department of Fisheries and Oceans
Gulf Region
P.O. Box 5030
Moncton, (New Brunswick)
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Fisheries Development Branch
Department of Fisheries and Oceans
Quebec Region
P.O. Box 15,500
901 Cap Diamont
Quebec City, (Quebec)
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LES TEXTES SONT DISPONSIBLES EN FRANCAIS SUR DEMANDE

Keep your engine at peak efficiency

The diesel engine has a well earned reputation for running smoothly and with less care than other types of power plants. Despite its rugged construction though, it isn't entirely maintenance free.

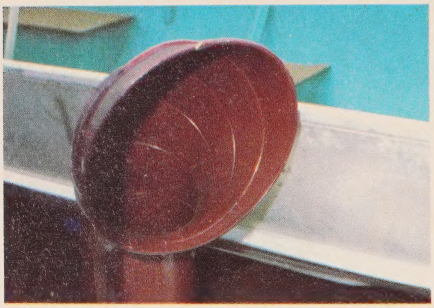
With this booklet we hope to offer you some suggestions which will assist you in keeping your boat's engine at peak efficiency and provide savings in both repairs and fuel economy.

Although the engine that drives your boat is much like the engine in a car or truck the penalties for lack of care and attention can be much more severe. Your boat doesn't gently roll to a stop when the engine quits, instead it remains at the mercy of wind, tide and rocky shoals.

Your boat is constantly being knocked about and this buffeting can knock finely tuned parts out of adjustment and loosen important nuts and bolts. A large part of your preventive maintenance therefore will involve little more than an occasional trip around the engine with a wrench and screwdriver.

Having to be towed back to port is embarassing but it can also be costly in lost fishing time for you and your crew. If you're lucky you have the parts and repairs can be made quickly. Preventive maintenance however makes a lot more sense and can help you avoid embarassing and costly breakdowns.

Inadequate ventilation a serious problem



An essential commodity for combustion is air. The lack of an adequate air supply will result in a reduction in H.P. and operating efficiency of your engine. Most diesel mechanics will tell you that this is one of the most common and serious problems. Improper ventilation in the engine room can cause high temperatures on engine parts and excessive engine deposits.

Your air vents must be large enough to permit the free flow ot clean fresh air into the engine room and the discharge of all engine fumes from it. Your exhaust should also be large enough to discharge the air your engine takes in.

If you're not really sure your engine room has adequate ventilation, check with a qualified boat builder or diesel engineer. Remember, a diesel engine requires 2 1/2 cubic feel of cool, clean air, per minute, per H.P. Make sure your air filter is cleaned and replaced as required. This is especially important on vessels having turbo-charged engines since an inadequately maintained air filter can cause restrictions to the compressor.

Watch for these indicators of air intake problems.

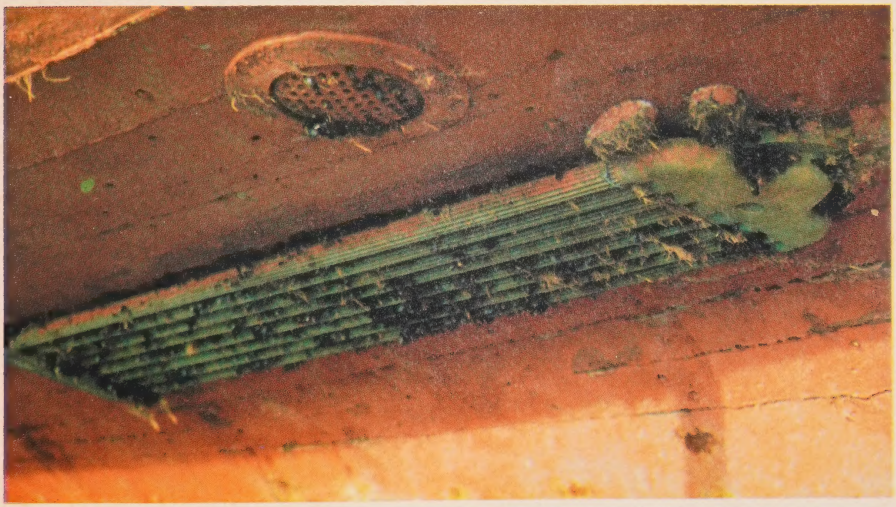
- ☐ Black smoke
- ☐ Loss of power
- ☐ Engine overheating

An overheated engine spells trouble

Each gallon of fuel that your engine burns is turned into heat and approximately one-third of this is converted into usable power. The remaining two-thirds is disposed of through the cooling system.

Your boats cooling system has a direct effect on the operation and service life of the engine. The three types of water cooling systems used in marine engines are

- ☐ Direct sea water
- ☐ Keel cooler
- ☐ Fresh water and heat exchanger



In the direct cooling method contamination is often a problem. Fish offal and other foreign matter floating in a harbour can find its way into the engine's internal passages. Periodic checks should be made on the whole system and especiallly the sea water intake. You should also make sure the thermostat is working properly and free from foreign matter.

In the keel cooling method contamination isn't a problem however the cooling pipes will need cleaning from time to time. This task should be looked after during your regular annual haulup.

The heat exchanger operates on the same principle as a keel cooler except that a special radiator is incorporated in the fresh water circuit instead of cooling pipes along the keel. This system uses sea water in addition to fresh water. Check the sea water intake periodically.

A corrosion inhibitor should be added to keel cooler and heat exchanger systems. This will help prevent corrosion and pitting of internal engine passages. You can

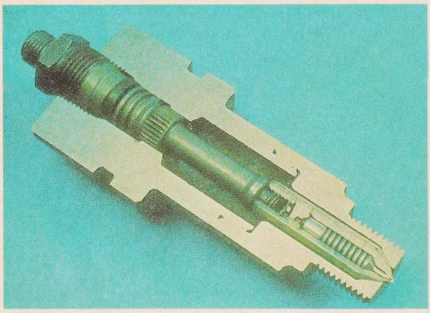
double the usable life of your anit-freeze by adding an inhibitor.

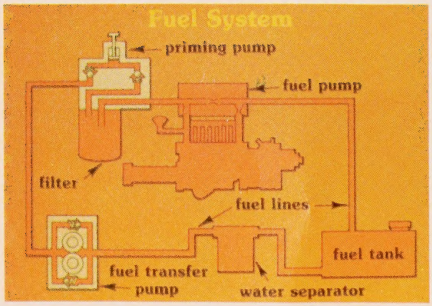
An overheated engine spells trouble both in engine wear and fuel consumption. Remember CHECK —

- ☐ The thermostat
- ☐ The sea water intake
- ☐ All hoses and clamps
- ☐ The water pumps
- ☐ Flush the system once a year

Todays marine engines usually come with zinc electrodes located in or near the engine's heat exchanger and oil cooler raw water pump. These rods help prevent the corrosive action of sea water. They should be checked and replaced as required.

Make sure your fuel is clean





The fuel injector is particularly prone to damage through dirt, water and other foreign materials. Your fuel is the life blood of the engine and the only lubrication in the injector pumps so it must be clean and free from abrasive materials.

To guard against this a set of primary and secondary filters in the fuel line trap minute dirt particles. In addition most engines come equipped with a water trap. This device traps any water which may be present in the fuel. It should be drained before starting your engine each day.

Your fuel filters should be changed according to your engine manufacturers recommendations.

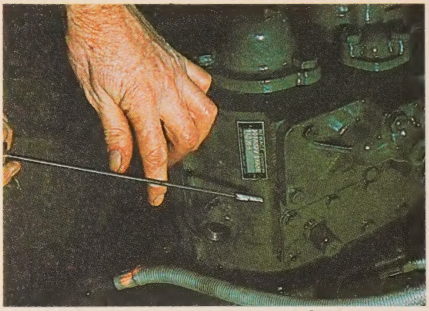
Look for these indicators of fuel system problems.

- ☐ Loss of power
- ☐ Rough running
- ☐ White smoke from the exhaust
- ☐ High exhaust temperatures

Lubrication...your engine needs it!

The lubrication requirements of diesel engines are more exacting than those of other types of internal combusion engines. Oils are especially formulated for diesel engines so make sure you are using the correct type. Your engine manual will tell you which type to use and when to change the oil and oil filter.

Your oil level should be checked regularly, and especially if you suspect your engine is burning oil. Blue smoke from your exhaust is a good indication your engine is burning oil, so have it looked into. Since oil will flow much better if it is warm you should give your engine a run before changing oil. This assures any sediments will be in suspension and drain more easily.



Incidentally, washing oil filter elements in solvents is not usually recommended because it doesn't clean them properly. It is far better to install a new filter. It doesn't cost very much.

Don't forget to clean your crankcase breather. A clogged breather can increase crankcase pressure and cause your engine to burn oil. It should be cleaned at least every other oil change.

Oil analysis...it isn't very expensive

It's also a good idea to have your oil analyzed professionally at each oil change. By doing this you can keep track of your engine's health and provide you with early warning of any developing problems. The concentration of each wear metal in the oil can tell if wear is normal or not. If the amount is excessive abnormal wear is occuring.

Analysis can indicate the source of

the problem and thus reduce repair time.

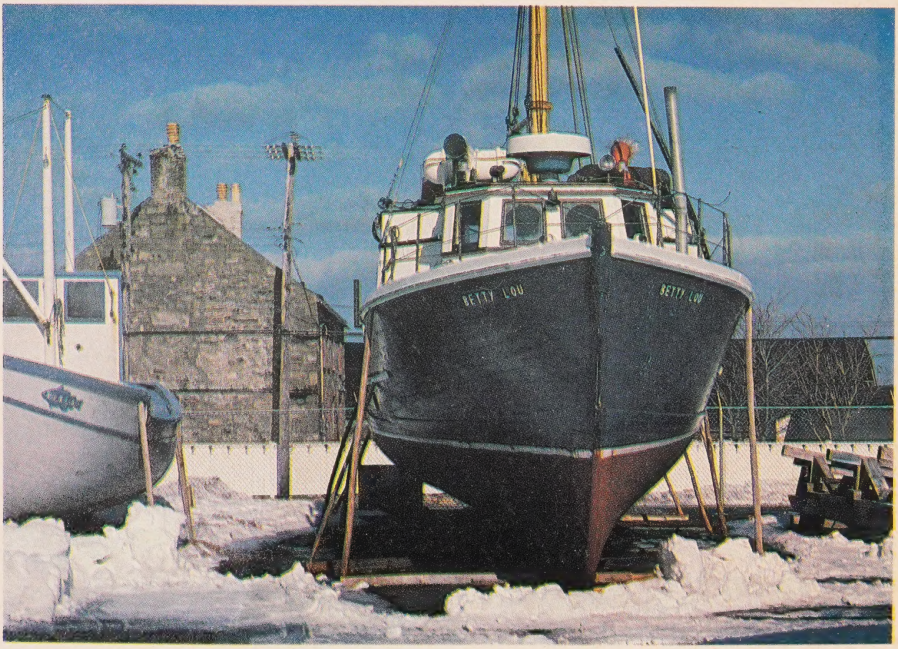
When you are collecting a sample for analysis make sure the drain plug and surrounding area are cleaned first. This will ensure that dirt and other foreign material will not pollute your sample and give an incorrect reading.

Oil analysis is available locally and isn't very expensive. It could save you a lot of money in costly overhauls. Check with your engine supplier for details.

Check the alignment

The maintenance requirements of the gearbox should include checking for leaks and that the proper oil level is maintained. Your driveshaft should be checked periodically for adequate lubrication and alignment. These areas have a small but very real effect on overall fuel economy.

It's a good idea also to disconnect the driveshaft before lifting your boat at the service center since the weight can cause the keel to bend putting the driveshaft seriously out of line. Should your driveshaft need realignment, most service centers are equipped to handle the job.



Back off the throttle... it's good advice

The easiest and least expensive action a skipper can take to save fuel is to throttle back. Its been proven that most vessels operate best at 3/4 throttle. Beyond this point it takes a lot more power and fuel to gain a little extra speed.

For example, a 45 ft. longliner equipped with a 165 H.P. engine running at 1950 RPM travels at a speed of 8.7 knots.

By decreasing the RPM to 1800, speed is reduced by only 1/5 of a knot yet the engine burns 28% less fuel.

In all Department of Fisheries and Oceans tests we have found similar results so the best advice we can give is "go as slow as time will allow".

Your boat and Ener Sea

In keeping with these concerns the Development Branch or Dept. of Fisheries and Oceans has developed a vessel analysis system to assist fishermen in improving their fuel consumption.

This system, known as EnerSea, is capable of predicting the savings which are possible after bottom cleaning, stern post fairing and engine tune-up. It can also help determine which propeller is best suited to a particular vessel, and its' operational requirements.

The EnerSea van houses computer hardware and software and is being used to assist vessel owners in making these energy related changes. Development and testing of the system is now under way and all vessels tested have shown improvements due to the various changes recommended.

Whether you operate a trapboat or longliner we are constantly researching ways to assist you in cutting expenses, but don't forget, it starts with you. Learn what you can about your boat and engine.

It's your money we're talking about

It's your money and livelihood we're talking about.

Remember a well cared for boat and engine will provide noticeable fuel savings over a poorly maintained one.

Notes

Fisheries and Oceans
Pêches et Océans

Design and Production by
Bec II Film Productions
and Vic Andrews Ltd.
St. John's, Newfoundland